

FACT SHEET FOR NPDES PERMIT WA-002095-8

FACILITY NAME:

Midway Sewer District - Des Moines Creek Treatment Plant

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INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit, and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

GENERAL INFORMATION	
Applicant	Midway Sewer District P.O. Box 3487 Des Moines, WA 98032-0209
Facility Name and Address	Des Moines Creek Treatment Plant 1200 South 216 th Street Des Moines, WA 98198-0704
Type of Treatment	Trickling Filter/Solids Contact
Discharge Location	Waterbody Puget Sound Latitude: 47° 24' 12" N Longitude: 122° 20' 12" W
Water Body ID Number	WA-PS-0270

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

HISTORY

The Midway Sewer District (District) operates the Des Moines Creek Treatment Plant. The original plant began operation in 1965, and an upgrade to secondary treatment was completed in 1989. It currently serves an area of approximately 12 square miles in King County, Washington. The service area is bounded on the north by South 170th Street, on the east by U.S. Interstate 5 (I-5), on the south by South 272nd Street and Star Lake Road, and on the west by Puget Sound. The service area includes the city of Des Moines, portions of the cities of Burien, Federal Way, Kent, Normandy Park, and SeaTac, and a small portion of unincorporated King County. Currently, an area approximately 1.2 square miles located within the District does not have sewer service. The population served is projected to increase from a base of 39,204 in 1990 to approximately 52,570 by 2020. Dry weather flows are expected to increase from about four mgd in 1995 to six mgd by 2020 while wet weather flows are expected to increase from 5.9 million gallons per day (mgd) in 1995 to 8.3 mgd in 2020. The service area is mostly residential but includes domestic sewage from the SeaTac International Airport, restaurants, and several large motels.

In 1994 and 1995, the flows and total suspended solids to the treatment plant were found to exceed the 85 percent of the design capacity for three or more consecutive months. In August 1995, the Washington State Department of Ecology notified the District and directed the District to prepare a “Plan to Maintain Adequate Capacity.” In December 5, 1996, the District submitted an engineering report, *Evaluation of Wastewater Facility Capacity, Midway Sewer District*, November 1996, URS Consultants, Inc., which addressed the treatment plant capacity. The report determined with the exception of the primary digester and the chlorine contact chamber all other unit processes could treat flows at or above a flow rate of nine mgd. The report recommended the construction of an equal volume primary digester to increase the capacity to 12 mgd; modifying the chlorine contact chamber to incorporate ultraviolet disinfection; and replacing the existing 30-inch diameter effluent outfall with a 42-inch diameter outfall. The District later amended the 42-inch diameter outfall by a 48-inch diameter outfall to provide additional capacity for periods of higher than predicted flows. On June 3, 1997, Ecology issued an approval of the engineering report and addendum.

In 1999, the District completed the construction of the primary digester and the ultraviolet disinfection system in accordance with the engineering report. The primary digester has been operational since September 1, 1999, and the ultraviolet disinfection system since September 23, 1999. The 48-inch diameter outfall is currently under construction and is anticipated to be operational by the end of year 2001 at the earliest.

The Des Moines Creek Treatment Plant is ranked as an EPA major facility.

COLLECTION SYSTEM STATUS

The District's collection system consists of 141.6 miles of sewer pipe and 13 lift stations. The District has an ongoing infiltration/inflow maintenance program. Sewer lines are routinely checked using video equipment, and repairs are prioritized by severity. The District has an annual budget for spot repairs and trenchless repair work. The maintenance crews also do on-the-spot repairs as needed and check wet/dry flow rates to identify potential high infiltration/inflow when it occurs.

TREATMENT PROCESSES

The treatment process includes mechanical bar screens, grit removal, primary clarifiers, trickling filters, solids contact (to enhance settling of trickling filter effluent), secondary clarifiers, and ultraviolet disinfection. Presented in Appendix E is a schematic of the treatment process.

The Des Moines Creek Treatment Plant is rated as a Class III plant. It is staffed by eleven operators from 7:30 a.m. to 7:30 p.m. on weekdays and from 7:30 a.m. to 4:00 p.m. on weekends.

DISCHARGE OUTFALL

Secondary treated and disinfected effluent is discharged from the facility to Puget Sound via a 30-inch diameter pipe, which extends 1,400 feet out from the beach to a depth of approximately 178 feet. The diffuser section, which was installed in 1984, is 200 feet long and has 24 3-inch diameter ports and one 5-inch diameter end port. Treated industrial wastewater from the SeaTac International Airport Industrial Wastewater Treatment Plant is also discharged through this outfall (NPDES Permit No. WA-002455-1). Under the terms of a 30-year agreement with the Midway Sewer District, SeaTac cannot discharge flows in excess of 3.6 mgd from the Industrial Wastewater Treatment Plant when the combined flow from SeaTac and Midway Sewer District exceeds 90% of the outfall's present capacity of 19 mgd.

The District has submitted an engineering report for plant expansion, which includes replacing the 30-inch diameter outfall with a 48-inch diameter outfall and new diffuser in the same location. As of July 2000, the trunk and outfall are completed except for that portion under Marine View Drive. At the earliest, the outfall may be operational by the end of year 2001.

RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the Cedar Hill Landfill. Primary and secondary sludge is thickened, anaerobically digested, dewatered, and transported offsite for disposal. Since 1996, the District has changed sludge disposal site from the Rabanco's Roosevelt Regional landfill in Klickitat County, Washington to farmland in Sunnyside, Washington for landspreading. In 1999, 496.07 tons (dry weight) of sludge were sent to Natural Selection Farms in Sunnyside.

Presented in Table 1 is a summary of the dewatered digested sludge characteristics. Unless otherwise as noted, the values presented are reported on a “dry weight basis.” Not shown in the table are polychlorinated biphenyls results (EPA Method 8080) which were below detections.

Table 1. Dewatered Digested Sludge Characteristics

Parameter	Concentration (milligram per kilogram)
pH (su)	7.3 – 7.9
Ammonia Nitrogen	4,200 – 10,000
Total Kjeldahl Nitrogen	47,000 – 63,000
Nitrate + Nitrite Nitrogen	0.22
Total Solids (%)	13 – 19
Total Volatile Solids (%)	55 – 75
Arsenic	1.7 – 3.7
Cadmium	2.3 – 12
Chromium	26 – 44
Copper	390 – 550
Lead	Non-detect – 92
Magnesium	2,100
Manganese	870
Mercury	Non-detect – 4.4
Molybdenum	Non-detect – 15
Nickel	14 – 44
Phosphorus	21,000
Potassium	960
Selenium	5.0 – 6.9
Silver	14
Zinc	860 – 1,200

The District submitted an update to its residual solids management plan with its permit application addendum.

PERMIT STATUS

The previous permit for this facility was issued on September 3, 1992, and expired on August 1, 1997. An application for permit renewal was submitted to the Department on January 23, 1997, and accepted by the Department on January 30, 1997. The facility is currently operating under the terms and conditions of the expired permit, which was extended by Ecology on July 18, 1997.

The September 3, 1992, permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform Bacteria, Chlorine, and Cyanide. Permit requirements were modified three times based on effluent testing results. The permit was modified in November 8, 1993, to remove the cyanide limit, modified in September 14, 1994, to reduce biomonitoring frequency, and modified in September 11, 1995, to reduce priority pollutant testing frequency to correspond with biomonitoring frequency.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

On March 12, 1996, Ecology staff conducted a Regional Class II inspection of the treatment plant in fulfillment of the regional Class II requirements. Ecology inspectors found the plant appeared to be running well during the inspection and concluded the plant operation is good. The inspection reports are filed in the Permittee's records at the Northwest Regional Office.

During the history of the previous permit, the Permittee has remained largely in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

On two occasions, one in 1993 and one in 1996, the Permittee violated the maximum daily total residual chlorine limit of 0.73 mg/L. The total chlorine residual exceedance of 1993 was due to startup of a newly installed sodium hypochlorite dosing system to control algae growth in the secondary clarifier overflow weirs. The exceedance of December 1996 was due to a large storm event resulted in effluent overflowed from the chlorine contact chamber. A similar chlorine contact chamber overflow incident also occurred in February 1996 but without violating total residual chlorine limits.

There has been three overflows to date at the disinfection chamber. This is caused by the inability to secure permits for the construction of the marine outfall.

With the exception of the total chlorine residual violations, the only other violations have been influent loading exceedances of the plant's design flow, BOD loading capacity, and TSS loading capacity during the last two years of the permit. To address the plant capacity issue, the Permittee has submitted and received an approval on an engineering report to increase plant capacity to nine mgd. In 1999, the Permittee completed the construction of a 60-foot diameter primary digester, and modification of the chlorine contact chamber to incorporate ultraviolet disinfection. The District is currently constructing a 48-inch diameter outfall at the same location as the existing 30-inch outfall. Completion of the outfall has been delayed pending regulatory approval of the marine outfall and diffuser.

WASTEWATER CHARACTERIZATION

The concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. Table 2 presents a summary of the influent and effluent characteristics. The Priority Pollutant scans presented in the table contains only detectable compounds and elements.

Table 2. Wastewater Characterization

	Parameter	Concentration	
Influent ¹		Annual Average	
	Flow	5.349 mgd	
	BOD ₅	255 mg/L	
	Total Suspended Solids	209 mg/L	
Effluent		Monthly Average	
	pH (su)	6.65 – 6.90	
	Fecal Coliform Bacteria	29 organisms/100 mL	
	BOD ₅	10 – 19 mg/L	
	Total Residual Chlorine	0.13 – 0.22 mg/L	
	Total Suspended Solids	8 – 14 mg/L	
	Dissolved Oxygen	5.8 – 6.9 mg/L	
	Priority Pollutant Scan	Daily Composite (microgram per liter)	
		4/17/96	8/14/96
	Antimony	Non-detect	5
	Chromium	2	2
	Copper	14	13
	Zinc	43	44
	Acetone	Non-detect	3 J
	Methylene Chloride	1 J	1 J
	Chloroform	Non-detect	1 J
	Tetrachloroethene	1 J	Non-detect
	Gamma BHC (Lindane)	Non-detect	0.03 J
	Phenol	Non-detect	8
	Benzoic Acid	Non-detect	3 J
	Bis(2-ethylhexyl)phthalate	4 B	3

Note: ¹ – 1999 values

J ≡ Estimated value

B ≡ Detected in method blank and in the sample

SEPA COMPLIANCE

The District has completed the SEPA process for its proposed improvements. The District prepared an environmental checklist, and on May 22, 1996, issued a Determination of Nonsignificance for the plant expansion/improvement projects. A final Environmental Impact Statement for the trunk and outfall pipelines was completed on May 1996; the District issued a Mitigated Determination of Nonsignificance for the submarine outfall on January 27, 1999.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The existing permit specified a monthly average flow design capacity of six mgd for the treatment plant. The plant capacity analysis completed by URS Consultants, Inc., in November 1996 and approved by Ecology on June 3, 1997, identified all unit processes with the exception of the primary digester and the disinfection system can be operated at flows at or above nine mgd. To increase plant capacity, the District in 1999 completed the construction of a second primary digester and the implementation of ultraviolet disinfection. These plant modifications, according to the approved engineering report, enable the treatment plant to treat wastewater at flows up to nine mgd.

On June 13, 2000, the District formally requested Ecology to revise the Des Moines Creek Treatment Plant capacity from six mgd to nine mgd. Presented in Table 3 are the existing and revised design criteria for the treatment plant reflecting recent plant improvements. The influent BOD₅ and TSS loading values are derived based on the revised design flow capacity of nine mgd.

Table 3. Design Criteria for the Des Moines Creek Treatment Plant

Parameter	Existing Design Capacity	Revised Design Capacity
Average Daily Flow, Maximum Month	6 mgd	9 mgd
Instantaneous Peak Flow	18 mgd	18 mgd
BOD ₅ Average Influent Concentration	250 mg/L	250 mg/L
BOD ₅ Average Influent Loading	12,500 lbs./day	18,765 lbs./day
TSS Average Influent Concentration	200 mg/L	200 mg/L
TSS Average Influent Loading	10,000 lbs./day	15,000 lbs./day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

Presented in Table 4 are technology-based effluent limitations for pH, Fecal Coliform Bacteria, BOD₅, and TSS. These values are taken from Chapter 173-221 WAC and they are as follows:

Table 4. Technology-based Effluent Limitations

Parameter	Limitation
pH	Shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
Biochemical Oxygen Demand (5-day)	Average Monthly Limit is the most stringent of the following: <ul style="list-style-type: none"> 30 mg/L may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Total Suspended Solids	Average Monthly Limit is the most stringent of the following: <ul style="list-style-type: none"> 30 mg/L may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The existing permit has an average monthly Total Residual Chlorine limit of 0.24 mg/L and a maximum daily Total Residual Chlorine limit of 0.73 mg/L. Other than the two occasions, one violation due to startup of a sodium hypochlorite dosing system and the second violation due to a large storm event, the Permittee is able to comply with the residual chlorine limits.

In 1999, the District upgraded one half of the chlorine contact chamber to incorporate an ultraviolet disinfection system replacing the elemental chlorine disinfection system. Two medium pressure ultraviolet units, each with a nine-mgd capacity were installed, for a total disinfection capacity of 18 mgd. A third ultraviolet unit may be installed in a third channel to increase the system capacity to 27 mgd. The remaining half of the chlorine contact chamber is used as a “back-up” with sodium hypochlorite disinfection. Elemental chlorine is no longer being used or stored on-site.

Ultraviolet performance data submitted by the Permittee for the period October 1999 to April 2000 show, with the exception of November 1999, all monthly average Fecal Coliform Bacteria in the final effluent ranged between five to less than 10 organisms per 100 mL. For the month of November 1999, the monthly average Fecal Coliform Bacteria value was less than 40 organisms per 100 mL. These values comply with the average monthly limit of 200 organisms per 100 mL.

With the change from chlorination to ultraviolet disinfection, the Total Residual Chlorine limit has been eliminated from the proposed permit.

The following technology-based mass limits are derived based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

BOD₅ Monthly Average: $9 \text{ mgd} \times 30 \text{ mg/L} \times 8.34 = 2,250 \text{ lbs./day}$

BOD₅ Weekly Average: $1.5 \times 2,250 \text{ lbs./day} = 3,380 \text{ lbs./day}$

TSS Monthly Average: $9 \text{ mgd} \times 30 \text{ mg/L} \times 8.34 = 2,250 \text{ lbs./day}$

TSS Weekly Average: $1.5 \times 2,250 \text{ lbs./day} = 3,380 \text{ lbs./day}$

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS, taken from Chapter 173-221 WAC, are:

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Puget Sound East Passage, which is designated as a Class AA (Extraordinary) receiving water in the vicinity of the outfall. Other nearby discharges include Des Moines Creek, which receives storm water discharges and periodically has high fecal coliform, and storm water outfalls from the City of Des Moines. Another potentially significant nearby source of pollutants is the Des Moines Marina. Characteristic uses of Class AA waters include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized in Table 5 presented below.

Table 5. Surface Water Quality Criteria for Des Moines Creek Treatment Plant

Pollutant	Water Quality Criteria
Fecal Coliforms	14 organisms/100 mL, maximum geometric mean
Dissolved Oxygen	7 mg/L minimum
Temperature	13 degrees Celsius, maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls, which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC. The mixing zone (chronic) and the acute mixing zone are defined as follows:

The mixing zone extends a maximum distance of 356 feet (110 meters) in any direction from any individual port. The mixing zone extends vertically from the outfall diffuser to an upper boundary at the water surface. The most restrictive upper boundary occurs at Mean Lower Low Water (MLLW).

A zone where acute water quality criteria may be exceeded extends 36 feet (11 meters) in any direction from any port.

The existing diffuser consisting of four 48-foot pipe sections with 24 3-inch bell-shaped ports on opposing sides of the diffuser at eight-foot spacing plus a five-inch sharp-edged end port. The diffuser section begins at elevation -156 and ends at elevation -178 MLLW datum and terminates 1,800 feet offshore. The diffuser beginning at near-shore varies from 30-inch, 24-inch, 18-inch, and finally at 12-inch at the terminus.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of mixing models. The results of these analyses are presented in the engineering report *Evaluation of Wastewater Facilities Capacity, Midway Sewer District, November 1996, URS Consultants, Inc., and Effluent Mixing Zone Study for Port of Seattle Industrial Wastewater Treatment System, January 1997, Cosmopolitan Engineering Group, Inc., and Kennedy/Jenks Consultants.*

The Midway Sewer District report derived dilution factors for the proposed 42-inch diameter outfall/diffuser. At the critical winter months, for a design peak flow of 27 mgd, URS Consultants derived an acute dilution factor of 51 and a chronic dilution factor of 838.

The Port of Seattle report derived dilution factors for the existing outfall/diffuser and four additional outfall alternatives. For the existing outfall, Cosmopolitan Engineering derived an acute dilution factor of 60 and a chronic dilution factor of 470 for a design peak flow of 17.9 mgd. For this dilution analysis, the diffuser was modeled as a 25 3.16-inch sharp-edged port diffuser. The analysis did not take into consideration the effect of the 5-inch end-port to mixing. The report calculated a port discharge of 0.96 cubic feet per second from the end port and an average port discharge of 0.36 cubic feet per second for the three-inch ports. The higher flow from the 5-inch end port would likely result in a lower acute dilution factor.

The September 3, 1992, NPDES permit's dilution factors were modeled using EPA's UMERGE program for the existing diffuser and assuming worst case current and stratification conditions. An acute dilution factor of 56 was derived for a peak hourly design flow of 12 mgd, and a chronic dilution factor of 248 was derived for a maximum month flow of 6 mgd.

DILUTION ANALYSIS

For the proposed permit, the dilution of the existing outfall/diffuser has been evaluated using the EPA's PLUMES model. The dilution analysis takes into consideration the increase in plant flow, from a maximum monthly flow of 6 mgd to 9 mgd; and the impact of the increase flow from the five-inch end-port to effluent mixing.

The diffuser was analyzed by the hydraulics method described by Rawn, A.M., *et al*, and by the EPA PLUMEHYD model to determine the effects of the slope of the diffuser placement, the differential port diameters, and other physical parameters to port discharges. The results of the analyses are presented in Appendix C. The hydraulics analyses identified the 5-inch end port discharges flows at rates ranged from 1.9 to 2.8 times the flows from the 3-inch ports. To account for this substantial differential port flow, the diffuser was modeled on the basis of flows from the 5-inch end port for determining the acute dilution factor. For the chronic dilution factor determination, the diffuser was modeled based on a 25 3-inch port configuration. The EPA's PLUMES Model was used to model the diffuser dilutions, both acute and chronic, for the winter and summer critical flow periods.

Presented in Table 6 is a summary of the input parameters and derived dilution factors for the four cases evaluated. The effluent flow rates were derived based on the Discharge Monitoring Report flows for years 1997 to 1999 for the Des Moines Treatment Plant and the SeaTac International Airport Industrial Wastewater Treatment Plant. These flows are:

Winter Months

- Daily Maximum 20.297 mgd (November 1998)
- Monthly Average 9.423 mgd (December 1998)

Summer Months

- Daily Maximum 7.708 mgd (June 1998)
- Monthly Average 5.358 mgd (June 1997)

The receiving water parameters were based on values reported in the *Evaluation of Wastewater Facilities Capacity, Midway Sewer District*, November 1996, URS Consultants, Inc.

Table 6. PLUME Model Input Parameters and Derived Dilution Factors

Model Parameters	Acute Dilution Winter Months	Chronic Dilution Winter Months	Acute Dilution Summer Months	Chronic Dilution Summer Months
Total Flow	1.8 mgd ^a 0.0789 m ³ /sec	9.423 mgd (0.4129 m ³ /sec)	0.7 mgd ^b (0.0308 m ³ /sec)	5.36 mgd (0.2348 m ³ /sec)
# Ports	1	25	1	25
Spacing	1000 m	8 feet (2.438 m)	1000 m	8 feet (2.438 m)
Effluent Temp	15° C	15° C	21° C	21° C
Port Depth	156 ft (47.55 m)	156 ft (47.55 m)	156 ft (47.55 m)	156 ft (47.55 m)
Port Diameter	5 in (0.1270 m)	3 in (0.0762 m)	5 in (0.1270 m)	3 in (0.0762 m)
Port Elevation	4 in (0.1 m)	1.75 ft (0.5334 m)	4 in (0.1 m)	1.75 ft (0.5334 m)
Cont. Coefficient	0.61	1	0.61	1
Far Field Velocity	0.13 m/s	0.13 m/s	0.13 m/s	0.13 m/s
Current Velocity	0.05 m/s	0.13 m/s	0.05 m/s	0.13 m/s
Density Profile	Minimum Stratification ^c	Minimum Stratification	Maximum Stratification ^d	Maximum Stratification
Dilution Factors	49:1	961:1	94:1	1080:1

Note: ^a – 5-inch port discharge calculated per Rawn, A.M., *et al.*, method based on a diffuser flow of 19 mgd rather than the daily maximum flow of 20.297 mgd. The 19-mgd flow value is the rated capacity of the diffuser.

^b – 5-inch port discharge calculated per Rawn, A.M., *et al.*, method based on a diffuser flow of 7.708 mgd.

^c – Minimum Stratification (November)

Depth (m)	Temperature (° C)	Salinity (ppt)	Density (sigma-t)
0	10.51	29.81	22.85
5	10.54	29.91	22.92
10	10.56	30.02	23.00
20	10.64	30.20	23.13
30	10.66	30.26	23.18
50	10.65	30.37	23.26

^d – Maximum Stratification (July)

Depth (m)	Temperature (° C)	Salinity (ppt)	Density (sigma-t)
0	13.42	28.86	21.59
5	12.94	29.15	21.91
10	12.44	29.30	22.12
20	11.84	29.44	22.34
30	11.49	29.55	22.48
50	11.11	29.63	22.61

The PLUMES analysis identified the winter months as the critical period for effluent dilution where the effluent flows are at the highest. Presented in Table 7 are the dilution factors derived for the existing diffuser. When the new outfall and diffuser are completed, dilutions will be reviewed and permit limits modified if necessary.

Table 7. Existing Outfall Dilution Factors

Modeled Dilution for:	Dilution Factors	
	Acute	Chronic
Aquatic Life	49:1	961:1
Human Health, Carcinogen		961:1
Human Health, Non-carcinogen		961:1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD₅--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 10.5° C and the effluent temperature is 15° C. The predicted resultant temperature at the boundary of the chronic mixing zone is 10.5° C with no measurable increase in receiving water temperature.

Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Fecal Coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 961:1.

Under critical conditions, there is no predicted violation of the Water Quality Standards for Surface Waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxic chemicals were determined to be present in the discharge: ammonia, antimony, lindane, bis(2-ethylhexyl)phthalate, chloroform, chromium, copper, methylene chloride, phenol, tetrachloroethene, and zinc. A reasonable potential analysis (See Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

For ammonia, a total ammonia concentration of 173 mg/L in the treatment plant effluent was used in the reasonable potential analysis. This assumed effluent concentration is substantially greater than the average total ammonia concentration of 25 mg/L in normal domestic sewage.

The determination of the reasonable potential for ammonia, antimony, lindane, bis(2-ethylhexyl)phthalate, chloroform, chromium, copper, methylene chloride, phenol, tetrachloroethene, and zinc to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs in the winter months. The parameters used in the critical condition modeling are as follows: acute dilution factor 49:1, and chronic dilution factor 961:1.

No valid ambient background data was available for ammonia, antimony, lindane, bis(2-ethylhexyl)phthalate, chloroform, chromium, copper, methylene chloride, phenol, tetrachloroethene, and zinc. A determination of reasonable potential using zero for background resulted in no reasonable potential.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

WHOLE EFFLUENT TOXICITY

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center, 360-407-7472, for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute toxicity, and the Permittee will not be given an acute WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard." The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on the discharger's status as a major discharger, and knowledge of data or process information indicating regulated chemicals occur in the discharge.

A determination of the discharge's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards, thus an effluent limit is not warranted.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

In accordance with its previous permit, the Permittee completed a baseline sediment study on September 26, 1996. The Department's Environmental Review and Sediments Section (ERSS) reviewed the final report and found it satisfactory, but because contaminants were detected in the study, additional sediment monitoring is required near the end of the upcoming permit cycle.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED in 1992 and modified in 1993, 1994, and 1995

The new effluent limits for Fecal Coliform and pH are the same as in the permit issued in 1992 and as modified in 1993, 1994, and 1995. The new permit limits for Biochemical Oxygen Demand and Total Suspended Solids have been increased reflecting the expanded treatment plant capacity.

The new permit does not contain either Cyanide or Total Chlorine Residue limit. The Cyanide limit was removed in the 1993 permit modification based on new laboratory data showing that cyanide previously detected in the effluent was the result of analytical error and not due to the actual presence of cyanide in the effluent. The Total Chlorine Residue limit has been eliminated from the proposed permit given the recent plant upgrade eliminated the use of chlorine in effluent disinfection.

Presented in Table 7 is a summary of the existing and the proposed permit limits.

Table 7. Summary of Existing and Proposed Permit Limits

Parameter	Existing Permit Limits		Proposed Permit Limits	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average
Biochemical Oxygen Demand	30 mg/L 1,500 lbs./day	45 mg/L 2,250 lbs./day	30 mg/L 2,250 lbs./day	45 mg/L 3,380 lbs./day
Total Suspended Solids	30 mg/L 1,500 lbs./day	45 mg/L 2,250 lbs./day	30 mg/L 2,250 lbs./day	45 mg/L 3,380 lbs./day
Fecal Coliform Bacteria	200/100 mL	400/100 mL	200/100 mL	400/100 mL
pH	Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.		Daily minimum is equal to or greater than 6 and the daily maximum is less than or equal to 9.	
Parameter	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Total Chlorine Residual	0.24 mg/L	0.73 mg/L	-	-

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for activated sludge plants with over 5 mgd average design flow. The monitoring data is also required as part of the next permit application (EPA form 2A).

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The Des Moines Creek Treatment Plant laboratory is accredited for all parameters limited in this permit.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains condition S.5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in permit condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503. The disposal of other solid waste is under the jurisdiction of the King County Health Department.

Requirements for monitoring sewage sludge and recordkeeping are included in this permit. This information will be used by Ecology to develop or update local limits and is also required under 40 CFR 503.

PRETREATMENT

An industrial user survey may be required to determine the extent of compliance of all industrial users of the sanitary sewer and wastewater treatment facility with federal pretreatment regulations [40 CFR Part 403 and Sections 307(b) and 308 of the Clean Water Act], with state regulations (Chapter 90.48 RCW and Chapter 173-216 WAC), and with local ordinances.

Federal and State Pretreatment Program Requirements

Under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program [i.e., act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)]. Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g., tracking the number and general nature of industrial dischargers to the sewerage system). The requirements for a Pretreatment Program are contained in Title 40, part 403, of the Code of Federal Regulations. Under the requirements of the Pretreatment Program [40 CFR 403.8(f)(1)(iii)], the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)].

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge [WAC 173-216-110(5)] (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.). Industrial dischargers need to apply for a State Waste Discharge Permit sixty (60) days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g., tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities [40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.].

Wastewater Permit Required

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

Requirements for Routine Identification and Reporting of Industrial Users

The NPDES permit requires non-delegated POTWs to "take continuous, routine measures to identify all existing, new, and proposed SIUs and potential significant industrial users (PSIUs) discharging to the Permittee's sewerage system." Examples of such routine measures include regular review of business tax licenses for existing businesses and review of water billing records and existing connection authorization records. System maintenance personnel can also be diligent during performance of their jobs in identifying and reporting as-yet unidentified industrial dischargers. Local newspapers, telephone directories, and word-of-mouth can also be important sources of information regarding new or existing discharges. The POTW is required to notify an industrial discharger, in writing, of their responsibilities regarding application for a State waste discharge permit and to send a copy of the written notification to the Department. The Department will then take steps to solicit a State waste discharge permit application.

Requirements for Performing an Industrial User Survey

This POTW has the potential to serve significant industrial or commercial users and is required to perform an Industrial User Survey. The goal of this survey is to develop a list of SIUs and PSIUs, and of equal importance, to provide sufficient information about industries which discharge to the POTW, to determine which of them require issuance of State waste discharge permits or other regulatory controls. An Industrial User Survey is an important part of the regulatory process used to prevent interference with treatment processes at the POTW and to prevent the exceedance of water quality standards. The Industrial User Survey also can be used to contribute to the maintenance of sludge quality, so that sludge can be a useful biosolids product rather than an expensive waste problem. An Industrial User Survey is a rigorous method for identifying existing, new, and proposed significant industrial users and potential significant industrial users. A complete listing of methodologies is available in the Department of Ecology guidance document entitled "Conducting an Industrial User Survey."

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR, Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Support by the Department for Developing Partial Pretreatment Program by POTW

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

SPILL PLAN

The Department has determined that the Permittee stores a quantity of chemicals that have the potential to cause water pollution if accidentally released. The Department has the authority to require the Permittee to develop best management plans to prevent this accidental release under section 402(a)(1) of the Federal Water Pollution Control Act (FWPCA) and RCW 90.48.080.

The Permittee has developed a plan for preventing the accidental release of pollutants to state waters and for minimizing damages if such a spill occurs. The proposed permit requires the Permittee to update this plan and submit it to the Department.

EFFLUENT MIXING STUDY

The Department has estimated the amount of mixing of the discharge within the authorized mixing zone to determine the potential for violations of the Water Quality Standards for Surface Waters (Chapter 173-201A WAC). Condition S.9 of this permit requires the Permittee to more accurately determine the mixing characteristics of the discharge. Mixing will be measured or modeled under conditions specified in the permit to assess whether assumptions made about dilution will protect the receiving water quality outside the allotted dilution zone boundary.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
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1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.
1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

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1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

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1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application was published on February 7, 1997, and February 14, 1997, in *The Seattle Times* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on October 18, 2000, in *The Seattle Times* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should have been mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy, and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 425-649-7201, tmil461@ecy.wa.gov, or 425-649-4259 (TDD), or by writing to the address listed above.

This permit and fact sheet were compiled by Chung Ki Yee.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART--An acronym for “all known, available, and reasonable methods of prevention, control, and treatment.”

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation--The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation--The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction, e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short period of time as is feasible.

Industrial User--A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference--A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA)], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of >80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of <80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through--A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5% of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g., facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)--A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C--TECHNICAL CALCULATIONS

Several of the Excel[®] spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.wa.gov.ecology>.

APPENDIX D--RESPONSE TO COMMENTS

1. DISINFECTION PROCESS

Comment: There is no mention of disinfection anywhere within the permit.

Response: The fact sheet is a companion document to the draft National Discharge Elimination System (NPDES) Permit No. WA-002095-8. The ultraviolet irradiation disinfection process has been described in the fact sheet and as shown in a process diagram.

Comment: Monitoring the disinfection process should be an integral part of the WWTP operation, and monitoring results should be recorded on a regular basis. Instantaneous readings of UV transmittance is one example of an instantaneous reading that can be monitored on a regular basis.

Response: The UV system, consisting of two modules, is controlled by two independent PLC panels. Each PLC panel measures flow, retention time, UV transmittance, lamp intensity, dose, power level of the lamps, lamp life, status of each lamp, and status of the cooling system. The UV transmittance online monitor is serviced daily. Each morning the plant operator records the UV dose, flow, UV transmittance, lamp hours, power level, and lamp intensity. Each of the hardware components and the operating parameters is linked to an alarm that sounds in the control room. If the alarm is not silenced within one minute, the alarm is relayed to the phone dialer and will call the “On Call” pager. The phone dialer system is checked daily.

To ensure proper operation of the UV system and other components of the treatment facility, the Permittee is required by permit Condition S5. Operation and Maintenance, to properly operate and maintain all facilities and systems of treatment and control.

2. MIXING ZONE DESCRIPTION

Comment: We would like to see a reference to the fact that the mixing zone description will change when the new outfall is put into service.

Response: The statement “The mixing zone description will change when the new outfall is put into service” has been incorporated into S1.B. of the permit.

3. BYPASS PROCEDURES

Comment: We would like to see a reference that there has been three overflows to date at the disinfection chamber. This is caused by the inability to secure permits for the construction of this marine outfall.

Response: The statement “There has been three overflows to date at the disinfection chamber. This is caused by the inability to secure permits for the construction of the marine outfall” has been incorporated into the *Summary of Compliance with the Previous Permit* section of the fact sheet.

APPENDIX E--PLANT SCHEMATIC